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# Small Farms Research Update

USDA, ARS, SPA

Winter 2004

## Upcoming Events and Livestock Research

**Research Updates** are now available at  
[http://ars.usda.gov/main/site\\_main.htm?docid=2354&modecode=62-27-00-00&page=1](http://ars.usda.gov/main/site_main.htm?docid=2354&modecode=62-27-00-00&page=1)

### Upcoming Events

PLEASE MARK YOUR CALENDARS:

#### 25<sup>th</sup> Anniversary Celebration

The Dale Bumpers Small Farms Research Center will celebrate their 25<sup>th</sup> Anniversary on May 6, 2005. Former Senator Dale Bumpers will be an honored guest. As more information becomes available, we will let you know.

#### Sheep and Goat Field Day, fall 2005.

The 2005 Sheep and Goat Field Day will be on September 30 and October 1, 2005. There will be a tour of the ARS facility on September 30 and informal gathering in the evening. The program on October 1 will be at the South Logan County Fairgrounds. Topics to be covered during the field day include: 1) techniques in reproduction (artificial insemination, embryo transfer, accelerated breeding, out-of-season breeding), 2) new developments in parasite control, 3) a youth program, and more. There will be an opportunity to display animals/products, and visit with agents, and scientists. Contact Dr. Burke for additional details.

### Management of Barber pole Worm in Sheep and Goats in Arkansas

This publication will address management of *Haemonchus contortus* or barber pole worm, which is the parasitic nematode responsible for anemia, bottle jaw, and death of infected sheep and goats during summer months in Arkansas and other warm, humid climates. Recommendations are based on research findings and are subject to revision as we learn more about the biology of the parasite and host and alternative products that may act as anthelmintics.

First a little background on what is known on the biology of *H. contortus*. This parasite has a relatively short life cycle of approximately three weeks and thrives in warm, humid conditions. Grazing animals pick up infective larvae on forages that are relatively short. Early to mid-morning forages contain the most larvae on its dew covered tips. As the forage dries, the larvae migrate back to the moist soil. Once in the rumen the larvae continue development, travel to the abomasum, or true stomach, and become adults. The adult female can lay thousands of eggs daily and can consume 200 microliters of blood daily. The eggs are deposited in the feces, hatch on pasture and the life cycle begins again. Outbreaks are worst when warm summer rains break up the fecal pellet and create a moist environment for the



hatched larvae. During drought or very cold conditions, a majority of larvae become dormant or die and transmission to the animal is very low.

The parasite has developed resistance to all available pharmaceutical dewormers, ranging from low to complete resistance. This means that dewormers are not effective in reducing the adult worm population. The highest resistance has been observed with ivermectin (Ivomec®) and albendazole (Valbazen®) or fenbendazole (SafeGuard® or Panacur®) and low to moderate resistance has been observed with levamisole (Levasol®, Tramisol®). Resistance to moxidectin (Cydectin®) is prevalent and increasing on many farms. Moxidectin should not be used on farms unless selective treatment (treatment of a limited number of animals) is practiced. If moxidectin is used on all animals at once development of resistance will be accelerated.

Resistance has developed because past recommendations did not consider refugia, which is the maintenance of a population of worms that are sensitive to dewormers or in "refuge" from a dewormer. When treating all animals in a flock/herd as has been practiced in the past, only resistant worms survive. If these animals are moved to a clean pasture (one that has not been exposed to sheep/goats for four to six months or longer or has had hay removed from it) only resistant worms will develop in that pasture. However, if animals go back to a dirty pasture as now currently recommended, the resistant worms can breed with sensitive worms and maintain a worm population that should still respond to dewormers. In other words, the population of worms in refugia provides a pool of genes to dilute the resistant genes. This is the most important component of maintenance of a population of worms that will remain susceptible to dewormers. Past recommendations included deworming ewes over winter. We now know that this leads to survival of resistant worms and in the spring an outbreak of a more resistant *H. contortus* can occur. Current recommendations include

treatment of only animals in need. Untreated animals will harbor sensitive worms.

Selective treatment or deciding which animals to deworm can be decided by the use of FAMACHA. FAMACHA was developed by a group of veterinarians and scientists in South Africa and was validated in the southern U.S. by members of the Southern Consortium for Small Ruminant Parasite Control (SCSRPC; [www.scsrpc.org](http://www.scsrpc.org)). A complete description of FAMACHA can be found on the website. Briefly, FAMACHA is a tool used by farmers that consists of examining the color of the lower eyelid, matching the color on a chart that ranges from red or healthy to almost white or anemic. The lighter the color, the more anemic an animal is. Anemia occurs as a result of the adult worm removing more blood than the animal can replace. There may be other causes of anemia, so the farmer must be aware of the health and nutrition status of the flock/herd. Animals with red color can be left untreated, whereas paler scores indicate that an animal should be treated. Determining the need for deworming based on other criteria is being researched and include measures such as fecal egg counts (FEC), body condition scores (BCS), or weight change. Research indicates that 20% of the flock/herd carries 80% of the worms. Or in other words, 20% of the animals consistently are more susceptible to infection with *H. contortus*, carry the worms, and distribute the eggs in the pasture. Two important management conclusions result from this research. First, treatment of those 20% of the animals will greatly decrease the worm load in the pasture. Second, identification of these animals and culling them will decrease the worm load of the pasture and may increase the genetic resistance to parasites in your flock/herd. Identification of these animals is possible through the use of FAMACHA.

FAMACHA examination should occur more frequently on weaned lambs/kids and late pregnant/early lactation ewes/does. The immune system becomes depressed around the time of lambing/kidding, which leaves the animal more susceptible to parasites. Also,



watch for signs of an infection such as bottle jaw or animals that lag behind.

There are a variety of parasite control measures farmers can use in addition to anthelmintics. Farmers may use a combination of methods and must be thoroughly familiar with the advantages, disadvantages, and risks of each. Some of these include the use of tannin-rich forages such as sericea lespedeza, copper oxide wire particles, mixed species grazing, grazing browse rather than grass, and supplemental feeding. Recently there has been some success in reducing FEC and perhaps the adult worm numbers by feeding sericea lespedeza, either fresh or as hay. Animals prefer the young plant, but it should not be grazed until it is at least six inches in height to preserve the plant. Over-mature plants may lose the ability to reduce infection with *H. contortus*. More research is being conducted in these areas.

Copper oxide wire particles have been used to markedly reduce infection with *H. contortus* in lambs. Copper oxide is very different from copper sulfate, which when fed to sheep can quickly lead to copper toxicity. Copper oxide is given to animals as a bolus (not more than 2 grams) and should not be used more than one time per year per animal for sheep until more is learned on reducing the potential for copper toxicity during its use. Copper oxide is available for cattle as a supplement to alleviate copper deficiency. Copper oxide has been used in sheep for the same purpose. In some areas of the U.S. copper oxide should not be used because of the high levels of copper in the environment. Also, some breeds of sheep may be more susceptible to copper toxicity than others (Texel and dairy breeds). Copper oxide has also been used with mixed results in goats to reduce infection with *H. contortus*. Copper oxide appears to be effective in reducing FEC for at least a four week period and does not appear to be effective in reducing other intestinal worms. It may not be effective in all animals and it may be too slow to work in severe cases. If producers want to consider this option they must seek professional advice

to assess farm conditions, feeding programs, and other management and environmental factors that will affect copper oxide metabolism.

There are several grazing strategies that can minimize pasture contamination of larvae. Mixed species grazing is effective in reducing the population of worms on pasture. An example of an effective grazing strategy would be to allow cattle to graze pastures before sheep or goats. Mixed species does not include a mix of sheep and goats because they are both affected by *H. contortus*. Grazing resistant breeds of sheep (St. Croix, Barbado Blackbelly, Gulf Coast or Florida Natives, Katahdin) with susceptible breeds, may act to "sweep" pastures and reduce contamination to susceptible animals. Goats were evolved to graze browse rather than grass. Larvae cannot reach browse plant species and goats can be maintained with a low level of parasites using this management. Goats can be extremely susceptible to parasites if grazing only grass pastures. Rotational grazing has been used successfully to minimize pasture contamination, but more research is needed for southern pastures to make proper recommendations. Overgrazing or overstocking can quickly lead to parasite problems by creating large numbers of infective larvae on pasture. Avoid overstocking!

Supplemental feeding should not be overlooked as a means to control parasites. By increasing dietary energy, protein, or both, lambs and late pregnant or lactating ewes can become less affected by parasites. The health of the animal is improved and animals consume less infected pasture. A complete ration has been fed to lambs at the Booneville station resulting in nearly complete reduction in fecal egg counts and reduced anemia. More research is being conducted on this diet as a creep feed. Results will be available at the October 1, 2005 Sheep and Goat Field Day (see below for details).

Remember, if use of chemical dewormers becomes necessary, use proper



dose by knowing how much an animal weighs, administer drench in the back of the mouth (not on the tongue), and if possible, withhold feed from animal prior to treatment for more effective worm kill. It may sound a bit overwhelming to control internal parasites without complete reliance on chemical dewormers, but with a few changes in management, it is possible to control the parasites and be productive. As always, contact Dr. Burke ([jimburke@spa.ars.usda.gov](mailto:jimburke@spa.ars.usda.gov)), a veterinarian, or extension agent for help or advice if necessary. To schedule a FAMACHA training session near you please contact your local extension agent (if not trained ask them to see Dr. Burke).

The 2005 Sheep and Goat Field Day will be held at the South Logan County Fairgrounds in Booneville, AR on October 1, 2005 (there will be a tour of the ARS facility on September 30 and informal gathering in the evening). Topics covered will include techniques in reproduction (artificial insemination, embryo transfer, accelerated breeding, out-of-season breeding), new developments in parasite control, a youth program, and more. There will be an opportunity to display animals/products, a lamb or goat barbeque, and a chance to interact with other producers, extension agents, and scientists. Guy Robson will again provide useful advice on animal techniques (docking, castration, etc.).

Mention of trade names or commercial products in this manuscript is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.

### Progress Report Regarding Livestock Related Research with LAT

In 2003 and 2004, representatives of the Landowners Association of Texas (LAT) approached Southern Plains Area office of ARS/USDA regarding the need for research

results, especially in the areas of vegetable production and livestock (beef, sheep, and goat) production. Scientists from the Lane Oklahoma and Booneville Arkansas locations met with LAT members to develop a series of the on-farm demonstrations and research programs to address the specific needs of farmers in NE TX. Scientists from the Lane location are using their expertise in vegetable and fruit production, while scientists from Booneville have been involved in executing research regarding the productivity of forage species.

The objectives of the livestock related research project are; 1) identification of forage species that can compete with bahiagrass; 2) identification of forage species that grow better in late summer or retain nutrient during summer stockpiling; and 3) identification of cool season grasses that perform well in NE TX.

The first phase of the research was started in 2004. During February 2004, David Brauer (Research Leader) and Sam Tabler (Animal Scientist) toured 5 potential sites for forage evaluation plots- 2 in Smith County, 1 in Houston county and 2 in Leon county. During the week of April 5-9, 2004, Dave Brauer, Sam Tabler and Brent Wooley (Biological Science Technician) prepared the experimental area for planting at 3 of the 5 locations identified in February. These locations included the 2 in Smith County and the one in Houston County. Preparation work included: application of herbicide to kill existing vegetation, installation of corner posts for the plots' perimeter fence, analysis of soil type and collection of soil samples for fertility analysis. Only 3 locations could be accessed prior to equipment difficulties curtailing operations.

During the week of April 26-30, 2004, Booneville staff continued site preparation work. These activities included the completion of the perimeter fence at each of the three locations, application of lime and fertilizer and roto-tilling the areas in which warm seasons grasses are to be planted. Six different warm-



season forage entries were planted at the 2 Smith county locations. Soil was too wet at the Houston county location to plant prior to additional rainfall on April 29, 2004. The six warm-season entries being evaluated at this time are: common bermudagrass, Texas Tough bermudagrass, Pensacola Bahiagrass, "Alamo" switchgrass, "Pete" eastern gama grass and "Red River" crabgrass. Warm season forages were planted at the Houston county site on May 10 and 11, 2004. However, because the site was still wet, the size of the plots at the Houston county site was much smaller than those at the 2 Smith County sites.

Between June 16 and 18, 2004, plots at all three sites were sprayed with 2,4 D to kill emerging dicot weeds. Fairly nice stands of warm season forages were established at the 2 Smith County sites By August 10-12, 2004. Forage growth at the Houston county site was considerable less than at the Smith country sites. In all instance, almost no weeds were present. Bermudagrass, crabgrass and bahiagrass plots were harvest at the 2 Smith county sites in August. Crabgrass yields were significantly higher than that of the bahiagrass and bermudagrass, 4 tons per acre for the crabgrass versus a little more than 2 tons per acre for the 2 bermudagrass entries and one and half tons per acre for the bahiagrass. August and September in NE TX was fairly dry and little new growth of these forages occurred in these months. By August it was decided that the site of the plots on the Houston County farm would be moved to avoid the poorly drained area that was initially selected.

In October 2004, cool season plots were established at the three sites. The existing sod was roto-tilled and seed incorporated. An examination of the plots in December revealed that cool season forages had emerged.

The on-farm research has been a learning experience to date. One lesson we learned the hard way: a farmer knows his fields better

than we do. The landowner in Houston County warned us not to get too far down the field from the gate because the soil tends to stay wet. We heard but did not listen and we locating the plots initially in one of the wettest parts of the field. Second important lesson we learned was that if it can break it will. The list of causalities in 2004 included: 1) alternator on a van; 2) blown trailer tire due to a suspension pin snapping; 3) two flat tires on vehicles; 4) bent framing on a trailer; and 5) one clutch to a 1 ton pick-up; and 6) fuel pump between serial gas tanks.

### **Dale Bumpers Small Farms Research Center is a partnership among three institutions:**

**ARS-** conducts research related to livestock production and agroforestry; ARS staff can be reached at 479-675-3834.

**PMC/NRCS-** evaluation of vegetation and vegetation technology to retain soil and its productive capability; NRCS staff can be reached at 479-675-5182.

**Division of Agriculture / University of Arkansas-** dissemination of agricultural information. Extension Specialist, Billy Moore, can be reached at 479-675-5585.

### **ARS scientists at DBSFRC and their primary research focus:**

David Brauer- Agronomist/Research Leader investigating both agroforestry and livestock production

David Burner- Agronomist investigating crop production in agroforestry systems

Joan Burke- Animal Scientist investigating reproductive performance in cattle and production practices for hair sheep



## Dale Bumpers Small Farms Research

Michael Looper - Animal Scientist  
investigating beef cattle production.

Dan Pote- Soil Scientist investigating the  
effects of management practices on sediment  
and nutrient retention in agroforestry and  
livestock production systems.

### Attention

Are you interested in a person to speak at a  
meeting of your civic or agricultural group? If  
so, please contact David Brauer at 479-675-  
3834 to see if we can match your  
interests/needs to the expertise of the  
Center's staff.

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